Claims

I claim:

1. A Braille cell comprises a cavity with 4 bending elements working at its two sides. The top of the cavity is sealed with the rubber membrane or preformed membrane on which a Braille dot sit. There is a thin rod attached to the back side of the membrane in the cavity. The two supporting blocks are attached to the lower part of the two bending elements which are fixed at the lower part of two sides of the cavity. The cavity is full of the water or other liquid. The bending elements are made of the electroactive polymer including PVDF polymer, IPMC or other electroactive polymer actuators. The four bending elements are fixed at the two rigid stripes at the middle of the two opposite sides of the cavity. Driven by voltage or current the bending elements can bend towards inside or outside of the cavity. The hydraulic and latching mechanism is invented to make the compact and low power consumption Braille cell.

2. A Braille cell as claimed in claim 1 comprises a rectangular cavity with the bending elements working at its two sides.

3. A Braille cell as claimed in claim 1 comprises the cavity with its top sealed with a rubber membrane or preformed membrane.

4. A Braille cell as claimed in claim 1 comprises a thin rod attaching to the back side of the membrane in the cavity. The thin rod can move up and down with the motion of the membrane between reading and rest position.

5. A Braille cell as claimed in claim 1 comprises a cavity which is full of water or other liquid to serve as the pressure transferring medium.

6. A Braille cell as claimed in claim 1 comprises four bending elements fixed at two rigid stripes at the middle of its two opposite sides of the cavity.

7. A Braille cell as claimed in claim 1 comprises two supporting blocks attaching to the lower part of the two bending elements.

8. A Braille cell as claimed in claim 1 comprises the two supporting blocks which move towards the center beneath the thin rod to provide large supporting force at the reading position.

9. The bending elements are actuator made of electroactive polymer such as PVDF polymer, IPMC or other electroactive polymers.

10. The bending elements as claimed in claim 9 comprises the bimorph type actuator made of PVDF polymer which provides cantilever force.

11. The bending elements as claimed in claim 9 comprises using the photolithograph technology to make array of positive and negative electrodes on the surface of the PVDF polymer. The distance between the electrodes is in a range of several micro meters. So the driving voltage can be lowered to under 200 V.

12. The bending elements as claimed in claim 9 comprise IPMC (Ionic Conducting Polymer Metal Composite) to provide cantilever force.

13. The standard integrated microelectronic processing technology will be used to make array of the Braille cells.

14. A microelectronic processing technology as claimed in claim 13 comprises a step that a row of the cavities are made to serve as the housings of the Braille cell.

15. A microelectronic processing technology as claimed in claim 13 comprises a step that a row of the bending elements will be made.

16. A microelectronic processing technology as claimed in claim 13 comprises a step that two rows of the bending elements are put at two sides of the cavities.

17. A integrated microelectronic processing technology as claimed in claim 13 comprises a step that a row of membranes with the thin rod attached to it are put at the top of the cavity to seal the cavities.

18. An integrated microelectronic processing technology as claimed in claim 13 comprises a step that water is filled into the cavities.

19. An integrated microelectronic processing technology as claimed in claim 13 comprises a step that multi line and full page Braille display will be made by adding the rows of the Braille cells together.